

**PATENT COOPERATION TREATY**  
**PCT**  
**INTERNATIONAL SEARCH REPORT**  
(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference <b>KL001/2977WO</b>	<b>FOR FURTHER ACTION</b>	see Form PCT/ISA/220 as well as, where applicable, item 5 below
International application No. <b>PCT/CA2004/002183</b>	International filing date ( <i>day/month/year</i> ) 22 December 2004 (22-12-2004)	(Earliest) Priority date ( <i>day/month/year</i> ) 30 December 2003 (30-12-2003)
Applicant <b>MCDONALD DUNCAN ET AL</b>		

This international search report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This international search report consists of a total of 4 sheets.

☒ It is also accompanied by a copy of each prior art document cited in this report.

**1. Basis of the report**

- a. With regard to the language, the international search was carried out on the basis of the international application in the language in which it was filed, unless otherwise indicated under this item.

☐ The international search was carried out on the basis of a translation of the international application furnished to this Authority (Rule 23.1(b)).

- b. ☐ With regard to any nucleotide and/or amino acid sequence disclosed in the international application, see Box No. I.

2. ☐ Certain claims were found unsearchable (see Box No. II).

3. ☐ Unity of invention is lacking (see Box No. III).

4. With regard to the title,

☒ the text is approved as submitted by the applicant.

☐ the text has been established by this Authority to read as follows :

5. With regard to the abstract,

☒ the text is approved as submitted by the applicant.

☐ the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box No. IV. The applicant may, within one month from the date of mailing of this international search report, submit comments to this Authority.

6. With regard to the drawings,

- a. the figure of the drawings to be published with the abstract is Figure No.

1

☒ as suggested by the applicant.

☐ as selected by this authority, because the applicant failed to suggest a figure.

☐ as selected by this Authority, because this figure better characterizes the invention.

- b. ☐ none of the figures is to be published with the abstract.

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2004/002183

A. CLASSIFICATION OF SUBJECT MATTER: IPC<sup>7</sup>: F01K 27/00, F17D 1/04, F17C 7/00, F02C 1/02, C01B 3/02, C25B 1/00, H02K 7/00

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC<sup>7</sup>: F01K 27/00, F17D 1/04, F17C 7/00, F02C 1/02, C01B 3/02, C25B 1/00, H02K 7/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database(s) consulted during the international search (name of database(s) and, where practicable, search terms used)  
Delphion and Canadian Patent Database; and search terms used: carrier, line, natural, gas, pipeline, energy, flow, converter, water, extractor, generator, electrolyser, pressure, hydrogen, turb\*, turbo-expander, expander, pyrolysis, and let down.

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No(s).
Y	CA 1,274,399 A1 (KRYOS ENERGY INC.) 25 September 1990 (25-09-1990) Abstract; figure 1; and claims 1 to 10	1 to 58
Y	US 6,196,021 B1 (WISSOLIK) 06 March 2001 (06-03-2001) Abstract; figures 1 to 6; and claims 1 to 21	1 to 51 and 54 to 58
Y	US 4,555,637 A (ACD INC.) 26 November 1985 (26-11-1985) Abstract; figures 1 and 2; and claims 1 to 9	1 to 51 and 54 to 58
Y	US 5,003,782 A (KUCERIJA) 02 April 1991 (02-04-1991) Abstract; figures 1 to 3; and claims 1 to 3	1 to 51 and 54 to 58

[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

* Special categories of cited documents :	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent but published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&" document member of the same patent family
"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

31 March 2005 (31-03-2005)

Date of mailing of the international search report

04 May 2005 (04-05-2005)

Name and mailing address of the ISA/CA  
Canadian Intellectual Property Office  
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# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/CA2004/002183

## C (Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No(s).
Y	CA 2,128,349 AA (ORMAT INDUSTRIES LTD.) 23 January 1995 (23-01-1995) Abstract; figures 1 to 3; and claims 1 to 11	1 to 51 and 54 to 58
Y	CA 2,212,138 AA (LUNDBERG) 02 february 1998 (02-02-1998) Abstract; figures 1 to 12; and claims 1 to 22	1 to 51 and 54 to 58
Y	EP 0 596 143 A1 (AKTSIONERNOE OBSHESTVO "KRYOKOR") 11 May 1994 (11-05-1994) Abstract; figure 1; and claims 1 and 2	1 to 51 and 54 to 58
Y	US 6,167,692 B1 (GENERAL ELECTRIC CO.) 02 January 2001 (02-01-2001) Abstract; figures 1 to 2; and claims 1 to 16 "cited in application"	1 to 51 and 54 to 58
Y	US 6,638,413 B1 (LECTRO PRESS INC.) 28 October 2003 (23-10-1003) Abstract; figures 1 to 5; and claims 1 to 32 "cited in application"	1 to 58
Y	US 5,112,463 A (XUEMING) 12 May 1992 (12-05-1992) Abstract; figures 1 to 7; and claims 1 to 6 "cited in application"	1 to 58

**INTERNATIONAL SEARCH REPORT**  
Information on patent family members

International application No.  
**PCT/CA2004/002183**

Patent Document Cited in Search Report	Publication Date	Patent Family Member(s)	Publication Date
CA1274399	25-09-1990	US4711093 A WO8806704 A1	08-12-1987 07-09-1988
US6196021	06-03-2001	AU5136399 A WO0057118 A1	09-10-2000 28-09-2000
US4555637	26-11-1985	None	
US5003782	02-04-1991	None	
CA2128349	23-01-1995	EP0635673 A1 IL110362 A JP7167398 A NO942732 A US5606858 A US5685154 A	25-01-1995 29-06-2000 04-07-1995 23-01-1995 04-03-1997 11-11-1997
CA2212138	02-02-1998	US2001003247 A1	14-06-2001
EP0596143	11-05-1994	RU2009389 C1 US5425230 A WO9324784 A1 WO9324785 A1	15-03-1994 20-06-1995 09-12-1993 09-12-1993
US6167692	02-01-2001	US6233916 B1	22-05-2001
US6638413	28-10-2003	US6797134 B2 US2004084325 A1	28-09-2004 06-05-2004
US5112463	12-05-1992	CN10195908 B DE4101420 A1 JP6017277 A	23-12-1992 05-03-1992 25-01-1994